May 18, 1943 H. A. GERSBACH 2,319,541

TOKEN CONTROL MECHANISM

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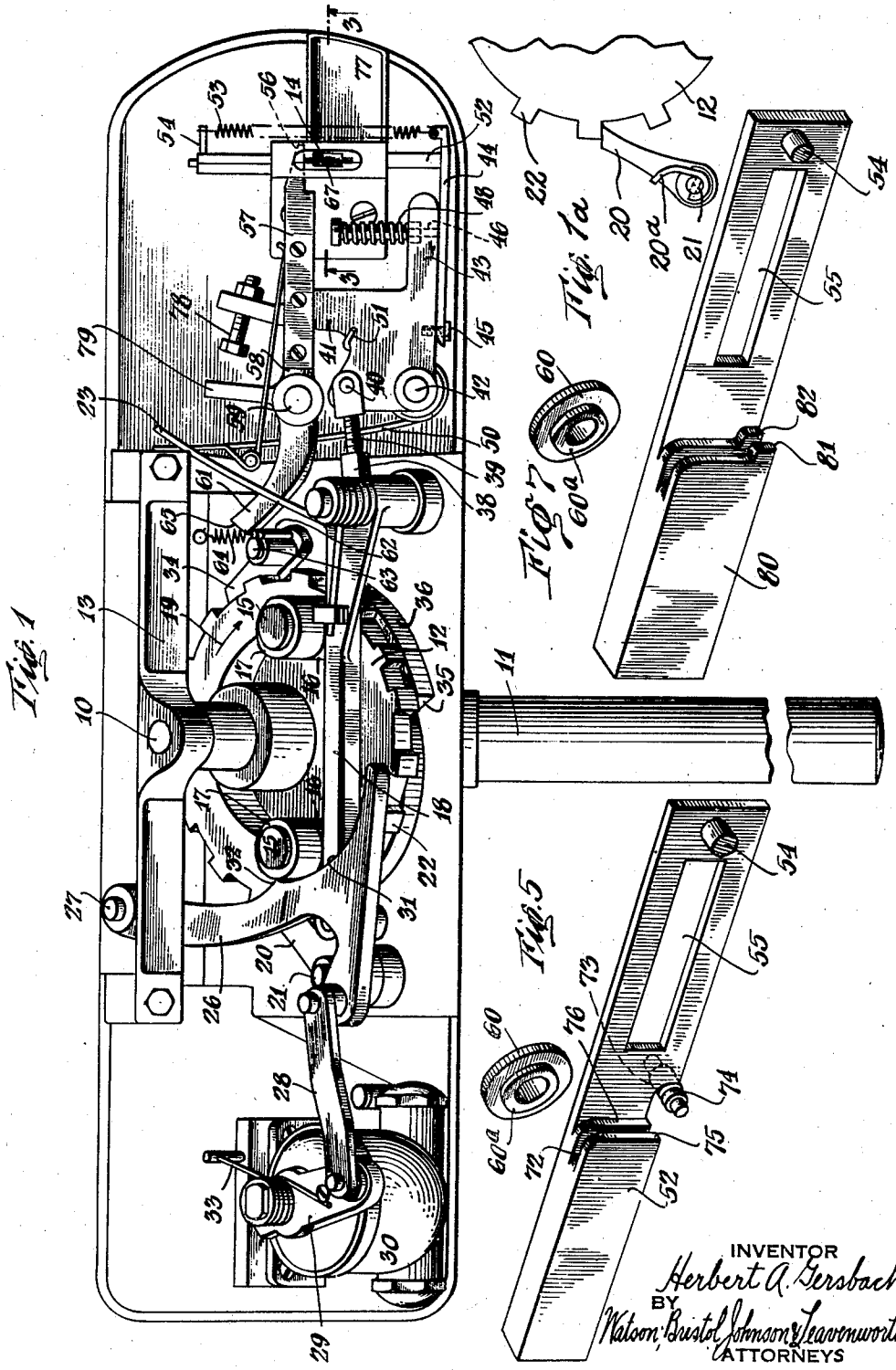


Fig. 1

Fig. 1a

Fig. 5

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Fig. 2

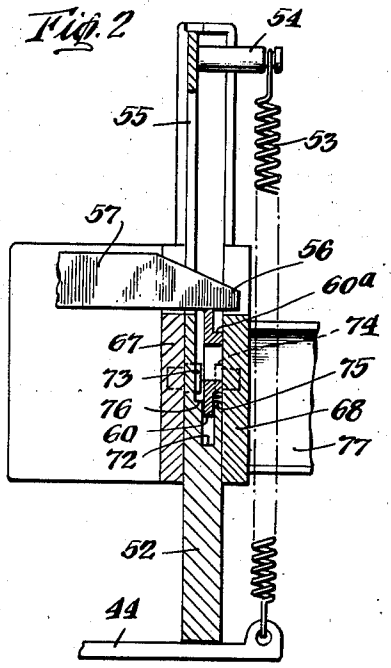


Fig. 3

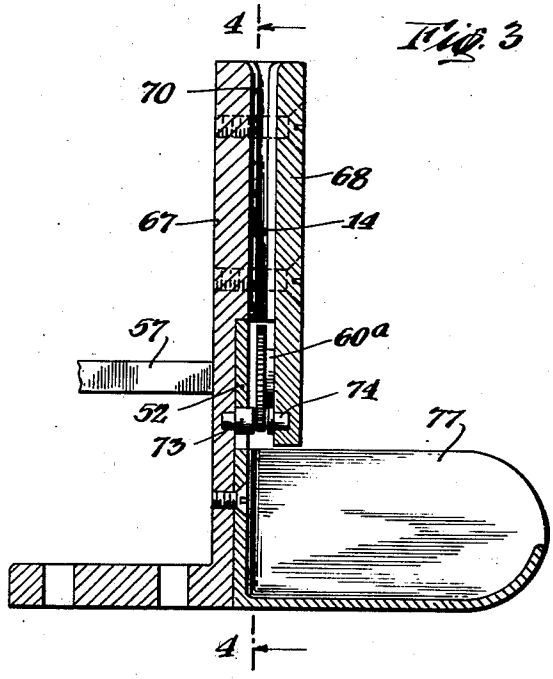


Fig. 4

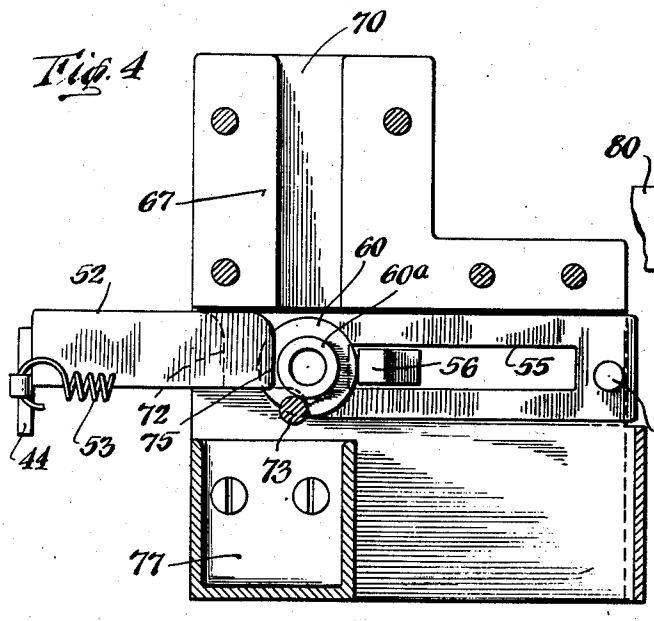
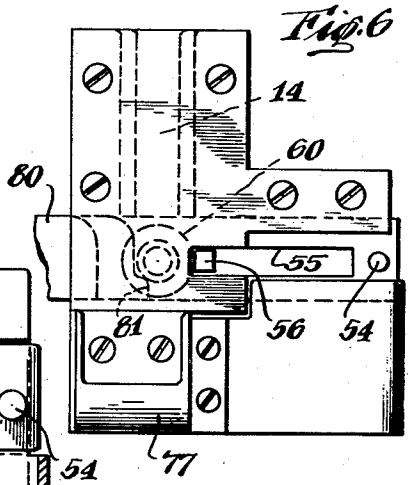


Fig. 6



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Fig. 9

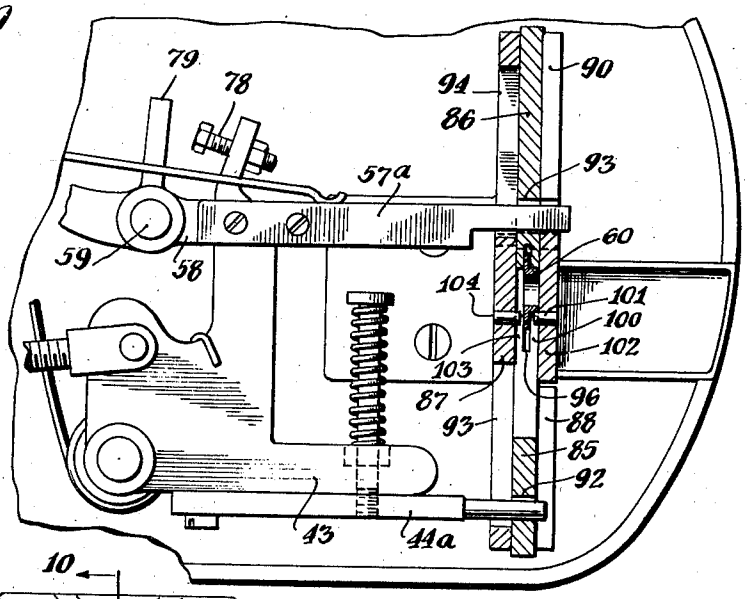


Fig. 8

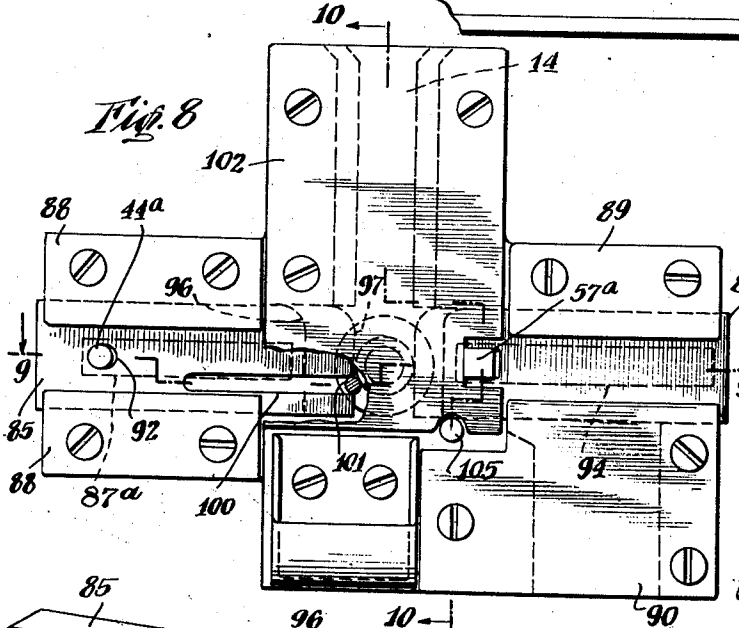
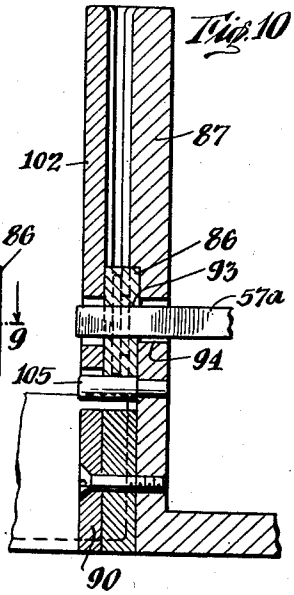


Fig. 10



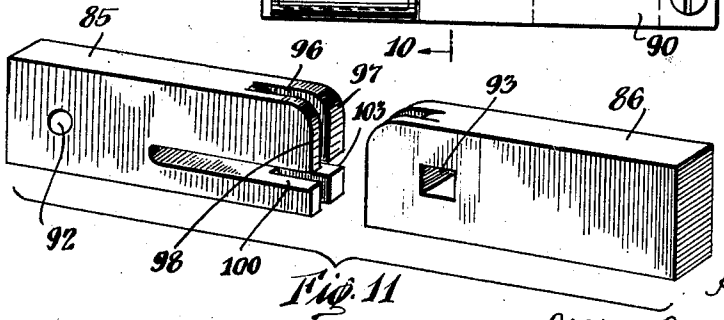


Fig. 11

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UNITED STATES PATENT OFFICE

2,319,541

TOKEN CONTROL MECHANISM

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Application February 1, 1940, Serial No. 316,795

4 Claims. (Cl. 194—4)

The present invention relates to an operating and control mechanism adapted to function in conjunction with a token of predetermined type. The invention is shown incorporated in a turnstile type of mechanism in which the inserted token becomes one of the elements in a chain of mechanical elements and serves upon the application of manual force to release a lock means permitting the turnstile to index and allow a patron to pass.

The manufacture, operation and maintenance of such a device presents certain problems rendered particularly difficult by reason of the fact that, in many instances, efforts to satisfy one set of conditions create or enhance other problems. As a general matter, a turnstile must not be so sensitive as to fail to operate on a slightly worn or damaged coin or token of the intended design, but, on the other hand, it must not operate on coins of other denominations or tokens intended for other devices.

Additional problems of a more specific character may be noted. In the matter of manufacture, for example, particularly of machines adapted to operate on tokens, it may be necessary to supply machines to several different companies, the machines of each company being operative on its own distinctive tokens. Economy of manufacture demands that all such machines be, as far as possible, of a standard construction. The machines of one company, however, must not only be incapable of operation by the tokens of another company, but in many cases they must also be incapable of operation by any standard coin.

Also, from the standpoint of use of any one machine or group of machines of a single company, it is not infrequent that counterfeit tokens suddenly make their appearance, and a problem is presented as to how to avoid the losses which would be incurred by the continued use of such counterfeits.

The means disclosed herein meets in an exceptionally effective manner such difficulties as are illustrated above. It comprises in general an apparatus designed to employ, and to function in a novel manner through a token of a disk-like type having a stepped diameter. The token, more specifically, comprises a main circular disk portion having a projecting circular hub portion of lesser diameter than the main portion. In the apparatus the token passes when inserted to a position between two directly opposed shiftable members, at least one of which members engages against the periphery of the hub portion of the token, and release of the lock mechanism and operation of the mechanism as a whole is effected through such relation of the token and machine parts. The shape and arrangement of the parts is such that a plain flat token, slug or coin, will, if it enters the machine at all, fall on through into the rejection pocket.

Various objects and advantages not described herein will appear from a specific embodiment.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of which invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a general assembly of a turnstile apparatus taken in a horizontal plan view with parts of the casing removed to reveal the working parts;

Fig. 1*a* is a fragmentary view showing the locking pawl in relation to the main ratchet plate;

Fig. 2 is a horizontal section through the token chute and token engaging slide;

Fig. 3 is a vertical section through the token chute and related elements taken on the line 3—3 of Fig. 1;

Fig. 4 is a vertical section through the token chute taken on the line 4—4 of Fig. 3;

Fig. 5 is a view in perspective of the token slide or finder element;

Fig. 6 is a view of a token chute and directly associated elements embodying a modified form of token slide or finder element;

Fig. 7 is a view in perspective of the modified token slide of Fig. 6;

Fig. 8 discloses an assembly of another form of token mechanism;

Fig. 9 is a cross-sectional plan view on the line 9—9 of Fig. 8;

Fig. 10 is a vertical cross-sectional view on the line 10—10 of Fig. 8; and

Fig. 11 shows in perspective the token slides of the mechanism of Fig. 8.

The invention may be embodied in various types of apparatus, of which the turnstile device of Fig. 1 is illustrative. The particular turnstile there shown is a compact one-way acting type having the arms rotatable about an axis arranged at an angle between the horizontal and

vertical. The assembly incorporates a hydraulic cushioning or silencing device for easing the turnstile into home position.

A main shaft 10 carrying the rotatable turnstile arms 11 and ratchet plate 12 is mounted in suitable bearings including the bracket 13. Since the main shaft is at an angle to both the vertical and horizontal and Fig. 1 is a horizontal plan view from above, parts of the mechanism there shown likewise appear at an angle. The apparatus at the right, however, is turned into a horizontal plane and the coin chute 14 is exactly perpendicular to the horizontal and the plane of the paper. As noted, the particular turnstile is of the three arm type, and only one arm 11, extending in a horizontal position, is visible in the view of Fig. 1, the other two arms extending in a more downward direction. The upper surface of the ratchet plate 12 carries three equally spaced studs 15, each carrying a pair of rollers 16 and 17. Only two of these studs appear in Fig. 1, the third being out of view behind the shaft 10 and the collars fitted thereon. The turnstile is shown in a normal home position in which the positioning or operating lever 18 pivoted on the main frame engages simultaneously against two of the rollers 16. In the normal indexing of the turnstile illustrated, the ratchet plate 12 rotates in the direction of the arrow 19, reverse movement being prevented by the pawl 20 pivoted on the stud 21 secured in a suitable frame part, the free end of the pawl 20 being adapted to engage the teeth 22 of the ratchet plate 12 as shown more clearly in Fig. 1*a*. A spring 20*a* may be employed to insure engagement of the pawl. A spring 23 urges the lever 18 in a clockwise direction, and after an advancing roller 16 has passed the midpoint in its contact with lever 18 the latter serves to urge forward the ratchet plate 12 and associated turnstile arm carrier into the succeeding home position.

The shock absorber means for easing the turnstile into home position includes a cam lever 26 pivoted to a frame portion at 27. A connecting link 28 is pivoted at one end to the cam lever 26 and at its opposite end to crank 29 of the hydraulic shock absorber 30. As the turnstile begins to approach its home position the oncoming roller 17, moving in a clockwise direction, engages the cam surface 31 of lever 26 and progressively swings the lever 26 in a clockwise direction moving the shock absorber crank 29 in a corresponding clockwise direction against the hydraulic resistance. As the turnstile reaches its home position the corresponding roller 17 is just short of the high point 32 of the cam surface 31. Upon the initiation of the next indexing movement roller 17 passes this high point and spring 33 on the shock absorber swings the levers 29 and 26 to the right in readiness for engagement of cam 31 by the next oncoming roller 17.

The turnstile is provided with a means for locking it normally against the operation by a patron through the medium of a latch or locking pawl 34 which engages one of the shoulders 35 formed on a plate 36 integral with or secured to the under side of ratchet plate 12. There are three of these shoulders 35 corresponding to the number of arms, only one of the shoulders 35 being visible in Fig. 1.

The control mechanism for releasing the locking pawl 34 will now be described. A link 38 is pivoted to a short arm integral with the operating lever 18 and extending at an angle thereto. A second link 39 is threaded at one end in link 38 and has its opposite end pivoted at 40 on the bell crank 41, which is pivoted to the frame at 42. The arm 43 of bell crank 41 has secured flexibly thereto an extension bar 44. The securing means includes a stud 45 passing through the left end of bar 44 and threaded into arm 43; and at an intermediate point of the bar 44 a pin 46 secured in the bar 44 but passing loosely through the arm 43. A spring 48 interposed between the capped end of the bolt 46 and the arm 43 permits a certain amount of resiliency in the event that the outer end of the bar 44 should meet with unusual resistance or an obstruction upon the counter-clockwise movement of the bell crank 41 corresponding to a rocking of the lever 18 in the advance of the turnstile. It will be observed that the lever 18 and its connection with link 38 rock about an axis which is not parallel to the axis of rotation of the bell crank 41. The connecting link 39, however, is free to turn in link 38, the arrangement as a whole permitting a certain amount of universal action to compensate for the pivots being in different planes. Modified or additional swivels or universal joint means may be provided if found desirable under particular operating conditions. The bell crank 41 is normally urged in a clockwise direction by a spring 50, one end of which is shown at 51 looped over the bell crank.

Further linkage leading to and designed to release the latch or pawl 34 through rocking of the lever 18 includes a token finder or slide bar 52, shown particularly in Figs. 2 to 5. The outer end of the bar 44 engages against one end of the slide bar 52, the two parts being resiliently held in this position by means of a coil spring 53 fastened at one end to the projecting end of the bar 44 and at the other end to a pin 54 secured on the opposite end of the slide bar 52. The slide bar has a cut-out slot 55, into which projects the outer finger 56 of a plate 57 secured to a release lever 58 pivoted to the frame at 59.

The details of the slide bar 52 and the cooperation therewith of the token, such as that shown at 60, will be described shortly, but for the time being it may be noted that the token is adapted to engage between the slide bar 52 and the finger 56 of the lever 58, and operation of the turnstile serves through the chain of mechanism already described to rock the lever 58, including the projecting arm 61 which engages a pin 62 mounted on the locking pawl 34 causing the pawl to move in a clockwise direction about its pivot 63. The coil spring 64 normally urges the pawl 34 into its locking position. As the lever 61 continues to move against the pin 62 the latter eventually rides around on to the end 65 of the lever 61. The surface 65, however, is arc-shaped, and continued movement of the lever 61 merely serves to hold the pawl in its unlocked position.

Turning now to Figs. 2 to 5, showing in more detail the token receiving means and operating mechanism therein, it will be noted that the pusher or slide bar 52 which may be termed a token finder member, is adapted to slide horizontally in a suitable opening in an auxiliary housing secured to the main frame. The housing includes a main casting 67, to which is secured a plate 68, at the adjoining surfaces of which is formed the token chute 14 suitably

shaped to receive a token of stepped diameter of the character shown in Fig. 5. As a matter of manufacture, the token chute may be made by forming a hub slot 70 in the main casting 67, the remaining parts of the token passage being formed conveniently in the independent plate 68. Note is made here of the fact that the token chute and the operating mechanism about to be described in detail are so shaped and associated as to permit a stepped diameter token to be used with the hub projecting in either of its 180° positions, i. e. either to the right or left in the showing of Fig. 1. This is of considerable advantage in respect of convenience to the patrons and in the speed with which patrons will pass through the turnstile.

A feature of particular importance is the association and embodiment in the lock release mechanism of operating elements which are adapted to engage on opposite edges of a token of the character heretofore mentioned, at least one point of engagement being the periphery of the hub portion. In operation one element acts as a pusher and presses directly against the token, and the token in turn pushes against the opposed element causing the latter to operate suitable mechanism connected thereto. The elements which engage the token may, within the scope of the invention, be shaped and arranged in various ways, and likewise be reversed as to location. As specifically shown in Figs. 2 to 5 the pusher element presses against the hub portion and the opposed operating element is adapted to be engaged by the periphery of the main token portion. Referring to the details of the mechanism shown in Figs. 2 to 5 the pusher or slide bar 52 is provided with a slot 72 adapted to receive the edge of the portion of the token of larger diameter. In operation when a token is dropped in the chute 14 it falls to a position corresponding to that shown in Fig. 4. It is prevented from falling on through by the fixed pins 73 or 74 located respectively in the casting 67 and plate 68 as shown particularly in Fig. 3. As shown, the hub portion 60*a* of the token engages the pin 74. In case a token is inserted with the hub projecting in the opposite direction, the hub would of course engage the pin 73. Correspondingly in the first case the token hub 60*a* would lie adjacent the shoulder 75 of the slide bar, and in the second case adjacent the shoulder 76. In either case in the form of Figs. 2 to 5 the periphery of the portion of the token of larger diameter will engage against the finger 56.

A pocket 77 is provided to receive any coins or tokens for which the machine is not designed and which fall through. In this connection attention is particularly directed to the fact that the machine is incapable of operation on an ordinary plain flat coin or token or slug of any size. If such a coin or other element is small enough to enter the token chute it will pass on through into the rejection pocket 77.

Assuming a proper token to have been inserted and to have reached the point illustrated in Fig. 4, for example, pressure on the turnstile arm 11 acts through the mechanism heretofore described to urge the slide bar 52 to the right in Fig. 4, causing shoulder 75 of the token slide to engage the hub portion 60*a* of the token and the outer periphery of the token in turn to engage against the finger 56 and cause it through the mechanism heretofore described to release the pawl 34 and permit the turnstile to index one station. Near the end of the advancing movement of the slide 52, an adjustable stud 78 carried by the bell crank 41 as shown in Fig. 1 engages a finger 79 integral with the release lever 61 and accelerates the movement of such lever, causing finger 56 to advance more rapidly than the slide 52, releasing the pressure on token 60 and permitting it to drop into the main token receptacle, details of which are not shown but which, referring to Fig. 4, may be located to the right of and below the rejection pocket 77. Continued pressure on the arm 11 by the patron and also by the lever 18 on the respective roller 16 after the midpoint is passed will result in the return of the slide 52 back to the position shown in Fig. 4, for example, and the associated elements will be correspondingly restored to the respective positions shown in Fig. 1. It will be noted that the upper part of the rear wall of the slot 72, and likewise the top portion of the shoulders 75 and 76, are rounded off. This arrangement is useful in helping to hold back any additional token which may be resting in the chute above the token in the releasing position at the beginning of an indexing movement.

A modified form of slide 80 and associated mechanism are shown in Figs. 6 and 7. In this case the stop for preventing the proper token from dropping on through comprises a pair of shelf-like projections 81 and 82 integral with the slide 80. As shown particularly in Fig. 6, the shelves have rounded corners and extend to the right a distance short of a vertical line passing through the center of the token. Accordingly, when, as heretofore described, near the end of the movement to the right the finger 56 moves away from the token, the token will readily roll off the shelf 81 or 82, as the case may be, and drop into the token receiving chute. It may be noted incidentally that in accordance with the normal design of the type of mechanism shown, the finger 56 is advanced relative to the slide 80 a considerable distance, entirely ample to permit the release of the token as described.

With a suitably designed chute 14 it will be apparent that a token which is oversize either as to the outer diameter or the diameter of the hub portion would be incapable of insertion. On the other hand, a token in which either the outer diameter or the diameter of the hub was undersize would fail to release the machine. This is particularly apparent from Fig. 4, in which it will be seen that release of the pawl 34 and operation of the turnstile in general depends upon the distance diametrically across the token from one side of the hub portion to the opposite side of the main token portion. In other words, it depends on both the diameter of the hub portion and of the main portion of the token.

Another specific form of token engaging and control mechanism for releasing the lock means is shown in Figs. 8 to 11. In this case both the pusher or finder slide and the operating member which receives motion through the token engage the token hub. These token engaging members comprise two opposed slides 85 and 86. The slide 85 which is also termed the finder member operates in a suitable slot formed by the main casting 87 and auxiliary plates 88 secured thereto; and slide 86 operates in a similar slot formed by the main casting and the attached auxiliary plates 89 and 90. The bar 44 of the form of Figs. 1 to 5 has been replaced in the present form by bar 44*a* which projects through an opening 92 in slide 85, a slot 87*a* in the main casting 87 being provided to permit free movement of the

bar. Likewise the bar 57 has been replaced by bar 57a which projects through an opening 93 in slide 86, and the casting 87 has a slot 94 in which it moves.

The slides 85 and 86 may each be formed of a series of plates secured face to face or from a solid piece as shown with suitable saw cuts to produce the final form. The slide 85 has a slot 96 cut in from the end to receive the token portion of larger diameter permitting the forward shoulders 97 or 98 to engage the token hub portion depending upon in which direction it extends when inserted in the chute 14. The left end of slide 86 is similarly shaped with shoulders corresponding and opposed to the shoulders 97 and 98 of the slide 85.

The slide 85 has also a horizontal slot 100 into which projects the pin 101 secured in the front plate 102 of the coin chute; and a slot 103 for a similar pin 104 secured in the casting 87. These pins, it will be apparent, engage the token hub and serve to prevent a proper token from falling on through. It is desirable to have also in these various forms a means such as the pin 105 shown in Figs. 8 and 10 to insure that the token does not slip down any material distance until it reaches the token discharge passage at the right.

From the principles illustrated by the several forms of construction specifically described, it will be seen that various machines of substantially the same construction may be provided readily and economically, but with certain machines limited to operation by a distinctive token different from the tokens designed to operate other machines. There are various ways in which this can be easily accomplished; that is, a token having a different outer diameter or a different hub diameter may be compensated for by various simple changes. As illustrative, such changes may comprise making an adjustment at some point between connecting elements, the substitution of a new plate 57 providing a spacing of the elements a little different from that of the previous plate 57, and/or the substitution of a new token engaging slide. Any such changes may, of course, include the use of a new token chute. It should be noted that the various means of modification, of which the above are typical, may be employed also in the case where counterfeit tokens have made their appearance. In such case a new token can be adopted as, for example, one having a smaller hub portion. This together with a simple change in the machine will render it incapable of being operated by the counterfeit tokens.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an apparatus adapted to be controlled through the medium of a predetermined disk-like token of stepped diameter with a projecting hub portion, a movable token finder member, a movable operating member, said members being arranged in opposed relation and adapted to receive an intervening token of such character, a stop arranged to be engaged by the hub of the token to hold it between said members, said members being shaped to permit a token or coin of like or smaller size but without the hub portion to pass on through, and means for shifting said members and intervening predetermined token as a unit.

2. In an apparatus adapted to be controlled through the medium of a disk-like token of stepped diameter with a projecting hub portion, a movable token finder member and a movable operating member, said members being arranged to receive an intervening token of such character and to engage the token in diametrically opposed relation across the token, the operative engagement of at least one of said members being against the periphery of the hub portion, a stop located to be engaged by the hub of the token in the intervening position and cooperating with said operating member to hold the token in such intervening position, said stop being otherwise out of the path of the token and said members being shaped to permit a token or coin of like or smaller size but without the hub portion to pass on through, means for shifting said finder member against the token and thereby to shift the token and said operating member, and means for spreading said members to release the token.

3. In an apparatus adapted to be operated through the medium of a disk-like token of stepped diameter with a main portion of one diameter and an axially projecting hub portion of lesser diameter, said apparatus including a locking mechanism to be released through said token, a movable token finder, a movable release member, said members being arranged to engage such a token circumferentially in opposed manner between them, the engagement of at least one of said members being against the periphery of the hub portion, stop means cooperating with said hub portion to retain the token between said members, means for moving said token finder member, and means for releasing said locking mechanism from the movement of said release member under pressure from said token finder member acting through the token.

4. In an apparatus having locking mechanism adapted to be released and operated through the medium of a token of stepped diameter with a main portion of one diameter and an axially projecting hub portion of lesser diameter, a movable token finder member, a movable release member, said members being adapted to engage between them in diametrically opposed manner an inserted token of the character specified, the operating engagement of one of said members being against the periphery of the token hub portion, stop means cooperating with said hub portion to retain the token between said members, means for shifting said token finder member toward said release member, and means for releasing said locking mechanism from the initial movement of said release member under pressure from said token finder member acting through the token.

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